

V. *A few words respecting Insects and their Natural Enemies.*By ARTHUR G. BUTLER, PH.D., F.L.S., F.Z.S., F.E.S.,  
M.B.O.U.

[Read March 2nd, 1910.]

I WAS much interested in the perusal of Mr. H. Eltringham's account of his experiments on the edibility of Lepidopterous larvae by lizards; for, although it is now many years since I made experiments with these charming reptiles, I have for a long time—since 1883 in fact—kept a large family of living birds, with which I have frequently experimented.

That a bizarre appearance or startling colours afford considerable protection to certain caterpillars, in the case of all birds not intimately familiar with them, is an undoubted fact; though in the case of birds which see them daily they afford the caterpillars no protection whatever, but rather serve as an attraction. Thus many birds which naturally seek their food upon the ground will not look at or will be nervous of seizing the caterpillar of *Cerura vinula*, whereas those birds (like the Tits) which seek for much of their insect-food among the branches of trees seize it and tear it to pieces without a moment's hesitation.

Bright colours, and especially metallic colours, are very attractive to birds; consequently the golden chrysalides of some of the *Vanessae* and the more metallic *Plusiae*, such as *P. chrysitis*, are eagerly devoured by many birds; a fact which used to be doubted, on the supposition that a bird would mistake the colouring for actual metal. That birds reason I have no doubt; but, when in search of food, they test an object first, and reason about it afterwards when they have found it unpleasant.

Touching so-called warning colours I am very sceptical; a bird has a great appreciation of form and outline, and, however coloured, rarely attempts to eat a really nauseous insect after the first trial; though in the case of some moderately unpleasant caterpillars, rejected at first perhaps because their flavour was unusual, I have known a

hungry bird to take them a second time and acquire a taste for them.

To many birds, though by no means to all, the caterpillars of *Ganoris brassicae* are objectionable, and are systematically rejected, whereas those of *G. rapae* and *napi* are greedily eaten by all, and those of *Mamestra brassicae* by most. In like manner the hairy caterpillars of *Orgyia*, *Spilosoma* and *Euprepia* are eaten by most of the larger birds after the longer hairs have been rubbed off; but the smaller birds as a rule refuse them.

The larger Geometrid larvae are, I believe, protected quite as much by their thick skins as by their twig-like appearance and stiff immobility during the daytime. I have seen a bird try to break the skin of *Biston hirtaria* or *Urapteryx sambucaria* by banging it on the ground; but, owing to the rigidity of the long body and its lack of weight in proportion to its length, making no impression and rejecting it in disgust. Caterpillars fed upon ivy probably carry the rank smell of the leaves about them, and this may be offensive to birds apart from the flavour of the larvae themselves; so that the same caterpillars when fed upon apple would naturally be accepted without hesitation by a bird strong enough to break them up.

The caterpillars of *Abraxas grossulariata* are usually rejected by birds on account of their acid or acrid flavour, but Mr. W. T. Page, a member of the Avicultural Society, found that his Weaver-birds ate them without hesitation, and the imago of the same species is greedily accepted by several birds: this may also be the case with the generally rejected larvae of the Cinnabar Moth, but of late years I have had no opportunity of testing this point.

Most birds reject with scorn the caterpillar of *Pygaera bucephala*, yet it is the favourite food of the Cuckoo, and Jays will accept it, although they do not seem to care very much for it; if hungry, no doubt they would eat it freely.

I should expect all birds to eat caterpillars of *Stauropus fagi*, on account of its somewhat spider-like aspect when viewed from the front; spiders are the favourite food of all insectivorous birds and are snatched up greedily even by the tiniest birds, the little Waxbills of Asia and Africa attacking and devouring full-grown females of *Epeira diademata* with avidity.

For a sick insectivorous bird there is no better medicine than half-a-dozen good-sized spiders for two or three days

running. I have on two, if not three, occasions saved the life of one of my Scarlet Tanagers by supplying it with this medicine.

Touching terrifying attitudes in larvae I have no faith whatever. A Sphinx-larva is attacked at once whatever its attitude. On the other hand, if its anterior segments are so ornamented as to resemble the head of a venomous snake I do not for a moment doubt that, whatever its attitude, a bird would avoid it.

Birds are not terrified by attitudes, and a hungry bird is rarely deceived by the resemblance of an insect to a leaf; he sees the legs and immediately approaches and pecks it, which usually settles the matter to his satisfaction. It is against the passing bird not pressed by hunger that the insect's resemblance to surroundings is a protection.

In the case of a Stag-beetle, a Mantis, or probably of some of the larger tropical spiders, the upright attitude with open claws ready for defence naturally make the attacks of a bird wary: he leaps from side to side, getting in a peck and jumping back out of harm's way until he has capsized his small opponent, and then (for a time at any rate) he has it at an advantage. It is a most entertaining sight to put a good-sized *Lucanus cervus* into the cage of a Thrush in which there is space for free movement: the attitude of the little creature does not alarm but simply makes the bird cautious and cunning. It always seems to me that the more enthusiastic of the advocates of protective assimilation are in too great a hurry; they wish to prove that the advantages of protection are far greater than they actually are; as though it did not come to the same thing in the end if an animal's disguise or nastiness served at times to protect it as it would do if it were universally efficacious: it is merely a question of time, and Nature has had any amount of time to work her miracles in. That some caterpillars are more protected than others doubtless explains the fact that they have become a general nuisance, like those of *Pygaera bucephala* and *Abraaxas grossulariata*.

Nastiness is the factor which protects insects best from birds: they will rarely touch the common Soldier-beetle; but by far the greater number will freely eat the buzzing bee-like *Eristalis tenax* or the wasp-like Sun-flies; yet among the larger birds there are not a few which feed freely upon wasps, like the Bee-eaters, the Jay-Thrushes,

and others. In the case of *Dryonastes* (Jay-Thrushes) the wasp is seized and its tail rubbed backwards and forwards between the tail-feathers of the bird, in order either to break the sting or exhaust its venom, before it is eaten.

That many small birds are not afraid of wasps is evidenced by the fact that they build their own nests close to those of these much-shunned insects because of the protection thus afforded against predacious mammals. Insectivorous birds as a rule do not touch wasps because they object to the sting, and doubtless the intelligent little insects are well aware of the fact and therefore do not object to them as neighbours: possibly an occasional dead youngster tossed out of the nest may afford a welcome feast for the wasps.

Neither birds nor insects are credited generally with so much reasoning power as they undoubtedly possess, though the fact that they do reason is beginning to dawn upon men's minds.